

10/576906

AP20 Rec'd FROM TO 21 APR 2006
PCT/AU2004/001440

100 2004/04/21/00

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SEQUENCE LISTING

<110> Melbourne Health
Southern Health
5 Austin Health
St. Vincent's Hospital (Melbourne) Ltd. trading as St. Vincent's
Hospital Melbourne
Bayside Health
10 BARTHOLOMEUSZ, Angeline, Ingrid (US Only)
LOCARNINI, Stephen, Alister (US Only)
AYRES, Anna (US Only)
YUEN, Lilly, Ka, Wai (US Only)
SASADEUSZ, Joseph, John (US Only)

15 <120> Viral Variants; Detection and Application
<130> 12510140/EJH
<150> AU2003905776
20 <151> 2003-10-21
<150> AU2004900962
<151> 2004-02-25

25 <160> 42
<170> PatentIn version 3.1
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30 <211> 1007
<212> DNA
<213> hepatitis B virus
<400> 1

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-2-

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 35 40 45

35 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

40 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

40 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

45 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

50 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

55 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

- 3 -

5 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

10 Pro Phe Leu Leu Val Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

15 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

20 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile
210 215 220

25 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
225 230 235 240

30 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

35 Trp Gly Thr Leu Pro Gln Glu His Ile Val Gln Lys Ile Lys
260 265 270

<210> 3
<211> 226
<212> PRT
<213> hepatitis B virus

40 Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
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45 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Lys Ser Leu
20 25 30

50 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
35 40 45

55 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

60 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

- 4 -

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95

5 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
 100 105 110

10 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
 115 120 125

15 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Val Arg
 145 150 155 160

20 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Phe Ser Leu Leu
 165 170 175

25 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190

30 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205

35 Leu Asn Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220

Tyr Ile
 225

40 <210> 4
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 <212> DNA
 <213> hepatitis B virus

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 <212> PRT
 <213> hepatitis B virus

30 <400> 5

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35 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

40 Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

45 Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

55 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110

• **Unemployment** – the number of people who are not working but are available for work

• • • • •

- 7 -

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys
 35 40 45

5 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60

10 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
 65 70 75 80

15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 100 105 110

20 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125

25 Gln Gly Asn Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140

30 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
 145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175

35 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190

40 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile
 195 200 205

45 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220

50 Tyr Ile
 225

55 <210> 7
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 <212> DNA
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 15 ccccaacctc caatcactca ccaacctctt gtctccaat ttgtctggt tctcgctgga 480
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 35 acatattgta cacaaaatca gacaa 1045

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 <213> hepatitis B virus

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 50 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
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 55 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

- 9 -

Phe Ser Arg Gly Asn Thr Gln Val Ser Trp Pro Lys Phe Ala Val Pro
50 55 60

5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
65 70 75 80

10 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
85 90 95

15 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
100 105 110

20 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
115 120 125

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
130 135 140

25 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

30 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

35 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

40 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

45 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
225 230 235 240

50 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

55 Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys Ile Arg Gln
260 265 270

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<211> 226
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 20 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Lys Cys
 35 40 45
 25 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 30 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80
 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Trp Gly
 85 90 95
 35 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
 100 105 110
 40 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
 115 120 125
 45 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 50 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
 145 150 155 160
 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 55 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu

- 11 -

180 185 190

5 Leu Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Xaa
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210 215 220

15 Tyr Ile
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15
<210> 10
<211> 1021
<212> DNA
<213> hepatitis B virus

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c 1021

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<210> 11
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 <212> PRT
 5 <213> hepatitis B virus

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 35 40 45
 20 Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

 25 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

 30 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110
 35 Ala Arg Leu Ser Ser Thr Ser Arg Asn Val Asn Tyr Gln His Gly Thr
 115 120 125

 40 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

 45 Met Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

 50 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

 Pro Phe Leu Leu Thr Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190
 55 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val

- 13 -

195 200 205

5 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile
210 215 220

10 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
225 230 235 240

15 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

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40 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Glu Ala Pro Ala Cys
35 40 45

45 Pro Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

50 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

55 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly

- 14 -

100 105 110

5 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala
115 120 125

10 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

15 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Xaa Leu Ser Leu Leu
165 170 175

20 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

25 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

30 Leu Ser Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
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35 <210> 13
<211> 953
<212> DNA
<213> hepatitis B virus

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55 atcatcttcc tcttcacct gctgctatgc ctcattctct tgttggttct tctggactac 480

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 ttcttatggg agtggggctc agtccgttcc tcattggctc gtttactagt gccatttgtt 720
 10 cagtgggttc tagggcttcc cccactgtt tgggtttcag ttatgtggat gatgtggat 780
 tgggggcca gctgcacaa catcttgaat ccccttttac cgtattacc aattttcttt 840
 tgtctttggg tatacattta aaccmtaata aaaccaaagc ttggggctat tcccttaact 900
 15 ttatgggata tgggaattgga agttggggc ctgcccaggg aagatggcag ggg 953

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 25 <222> (288)..(288)
 <223> Xaa is any amino acid

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 20 25 30

40 Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile Val
 35 40 45

45 Asn Leu Leu Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His
 50 55 60

Ile Arg Ile Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu
 65 70 75 80

50 Val Asp Lys Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp
 85 90 95

55 Phe Ser Gln Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe
 100 105 110

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Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu
115 120 125

5 Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu
130 135 140

10 His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro
145 150 155 160

15 Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln
165 170 175

20 His Gly Thr Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr
180 185 190

25 Val Ser Leu Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu
195 200 205

Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val
210 215 220

30 Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser
225 230 235 240

35 Val Val Arg Arg Ala Phe Pro His Cys Leu Val Phe Ser Tyr Val Asp
245 250 255

40 Asp Val Val Leu Gly Ala Lys Ser Ala Gln His Leu Glu Ser Leu Phe
260 265 270

45 Thr Ala Ile Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Xaa
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Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Gly
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55 <210> 15
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<213> hepatitis B virus

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 5 <223> Xaa is any amino acid

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 25 Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val
 35 40 45
 30 Asn Pro Val Pro Thr Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg
 50 55 60
 Thr Gly Asp Pro Ala Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu
 65 70 75 80
 35 Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile
 65 90 95
 40 Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe
 100 105 110
 45 Leu Gly Gly Ala Pro Ala Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr
 115 120 125
 50 Ser Asn His Ser Leu Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg
 130 135 140
 Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu
 145 150 155 160
 55 Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro
 165 170 175

- 18 -

5 Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys
180 185 190

10 Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys
195 200 205

15 Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro
210 215 220

20 Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg
225 230 235 240

25 Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly
245 250 255

30 Leu Ser Pro Thr Val Trp Phe Ser Val Met Trp Met Met Trp Tyr Trp
260 265 270

35 Gly Pro Ser Leu His Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro
275 280 285

40 Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa Thr Xaa Ile Lys Pro Asn
290 295 300

45 Val Gly Ala
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40 <210> 16
<211> 988
<212> DNA
<213> hepatitis B virus

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50 ggggcctata ctttcttgct ggtggctcca gttccggaac agtaaacctt gttccgacta 180
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cctcttgtcc tccaatttgt cctgggtatc gctggatgtg tctgcccgt tttatcatct 480
 5 tctcttcat cctgctgcta tgcctcatct tottggttgt tcttctggac taccaggta 540
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 cctgcacgac tctgctcaa ggaacctcta tgtttccctc ttgttgctgt acaaaacctt 660
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 gggagtgggc ctgagtcctt ttctcctggc tcagtttact agtgccattt gttcagtgtt 780
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 caagtctgta caacatcttg aatccctttt taccgctgtt accaattttc tttgtcttt 900
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 20 atatgtaatt ggaagtggg gtaccttg 988

 <210> 17
 <211> 258
 25 <212> PRT
 <213> hepatitis B virus
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 35 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30
 40 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45
 45 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 55 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95
 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

- 20 -

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125

5 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

10 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

15 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

20 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

25 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

30 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
 225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
 245 250 255

35 Trp Gly

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 <210> 18
 <211> 226
 <212> PRT
 <213> hepatitis B virus

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50 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
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55 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
 35 40 45

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5 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

10 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

20 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
100 105 110

25 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
115 120 125

30 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

35 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

40 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

55 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
225

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<211> 1043
<212> DNA
<213> hepatitis B virus

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5	gcaagatccc agagtgtggg gctgtatct cctgtgtgtt ggctccagtt caggaacagc	180
	aaacctgtt cgcactactg cctctcgctt atcgtcaatc ttctcgagga ttggggaccc	240
	tgcgctgaac atggagaaca tcacatcagg actcctagga ccccttctcg tgttacaggc	300
10	gggggttttc ttgttgacaa gaatcctcac aataccgcag agtctagact cgtgggtggac	360
	ttctctcagt ttcttagggg gaactaccgt gtgtcttggc caaaattcgc ggtcccaaac	420
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	ggggcgtttt atcatattcc tcttcactct gctgctatgc ctcatcttct tgttggttct	540
	tctggactat caaggtagtg tgcccgcttg tctctaat ccaggatcct caaccaccag	600
20	cacgggaaca tgccgaacct gcacgactcc tgctcaagga acctctatgt atccctcctg	660
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	gatgtggtat tgggggcca gtctgtacag catcttgagt ccttttttac cgtgttacc	900
30	aattttcttt tgtcttggg tatacattta acccctaaca aaacaaagag atgggggttac	960
	tctctaaatt ttatgggcta tgtcattgga agttatgggt ccttgccaca agaacacatt	1020
35	atactaaaaa tcaaagattg ttt	1043

40 <210> 20
<211> 258
<212> PRT
<213> hepatitis B virus

<400> 20

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Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
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Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
35 40 45

55
Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
50 55 60

- 23 -

5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asp Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala
 85 90 95

10 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110

15 Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Asn
 115 120 125

20 Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

25 Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

30 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

35 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

40 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

45 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Thr Pro Asn Lys Thr
 225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
 245 250 255

50 Tyr Gly

55 <210> 21
 <211> 226
 <212> PRT

- 24 -

<213> hepatitis B virus

<400> 21

5 Met Glu Asn Ile Thr Ser Gly Leu Leu Gly Pro Leu Leu Val Leu Gln
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 10 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
 20 25 30
 15 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
 35 40 45
 20 Leu Gly Gln Asn Ser Arg Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
 65 70 75 80
 25 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95
 30 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 100 105 110
 35 Ser Ser Thr Thr Ser Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125
 40 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
 145 150 155 160
 45 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 50 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 55 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile
 195 200 205
 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val

- 25 -

210 215 220

5 Tyr Ile
225

10 <210> 22
<211> 1037
<212> DNA
<213> hepatitis B virus

<400> 22

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aagatcccag agtgagaggc ctgtatttcc ctgctggtgg ctccagttca ggaacagtaa 180
20 accctgttcc gaccactgcc tctcccttat cgtcaatctt ctgaggatt ggggaccctg 240
cgtgaacat ggagaacatc acatcaggat tcttaggacc cttctcgtg ttacaggcgg 300
25 ggtttttctt gttgacaaga atcttcacaa taccgcagag tctagactcg tgggtgactt 360
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ccaatcactc accaacctcc tgcctccaa cttgtcctgg ttatcgtgg atgtgtctgc 480
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35 cgggaccatg ccgaacctgc acgactcctg ctcaaggaa ccttatgtat cctcctgtt 660
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40 catttgtrca gtggttcgta gggctttccc ccaactgttg gctttcagtt atgtggatga 840
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acaaaaa 1027

50 <210> 23
<211> 264
<212> PRT
<213> hepatitis B virus

55 <400> 23

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 5 Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
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 10 Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45
 15 Phe Ser Arg Gly Asn His Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 20 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala
 85 90 95
 25 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110
 30 Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Thr
 115 120 125
 Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140
 35 Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160
 40 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175
 45 Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190
 50 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Val Asp Asp Val Val
 195 200 205
 Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220
 55 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr

- 27 -

225 230 235 240
 5 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Cys
 245 250 255
 Tyr Gly Ser Leu Pro Gln Glu His
 10 260
 <210> 24
 <211> 226
 <212> PRT
 15 <213> hepatitis B virus
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 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
 25 20 25 30
 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Glu Thr Thr Val Cys
 35 40 45
 30 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 35 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80
 40 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95
 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 45 100 105 110
 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125
 50 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 55 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
 145 150 155 160

- 28 -

Phe Leu Trp Glu Trp Gly Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 5 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 10 Ser Val Met Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile
 195 200 205
 15 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220
 Tyr Ile
 225
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 <211> 560
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 25 <213> hepatitis B virus
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 35 ctgctcaagg aacctctatg tatccctcat gttgctgtac caaaccttcg gacggaaatt 240
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 40 cccccattgt ttggttttca gttatgtgga tgatgtggtt ttggggggcca agtctgtatc 420
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 50 <211> 186
 <212> PRT
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 55 Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile
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5      Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly
        20                      25                      30

10     Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Ile Phe Asn
        35                      40                      45

15     His Gln His Gly Ser Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn
        50                      55                      60

20     Leu Tyr Val Ser Leu Met Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu
        65                      70                      75                      80

25     His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met
        85                      90                      95

30     Gly Val Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile
        100                     105                     110

35     Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr
        115                     120                     125

40     Val Asp Asp Val Val Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser
        130                     135                     140

45     Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu
        145                     150                     155                     160

50     Asn Pro His Lys Thr Lys Arg Trp Gly Tyr Ser Leu His Phe Met Gly
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55     Tyr Val Ile Gly Cys Tyr Gly Ser Leu Pro
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<211>  160
<212>  PRT
50 <213> hepatitis B virus

<220>
<221>  MISC_FEATURE
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55 <223> Xaa is any amino acid

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<400> 27

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 20 25 30
 Tyr Arg Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Ser Thr
 35 40 45
 Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr
 50 55 60
 Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys
 65 70 75 80
 Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp
 85 90 95
 Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe
 100 105 110
 Val Gln Trp Phe Val Gly Leu Ser Pro Ile Val Trp Leu Ser Val Met
 115 120 125
 Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile Leu Ser Pro
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 Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa
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<210> 28

<211> 1029

45 <212> DNA

<213> hepatitis B virus

<400> 28

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 55 aaacctgtt ccgactactg cctctcccat atcgtaate ttctcgagga ctggggaccc 240
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- 31 -

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	ctccaatcac tcaccaacct cttgtcctcc aatttgtcct gggtatcgct ggatgtgtct	480
	gcggcgtttt atcatcttcc tcttcacct gctgctatgc ctcatcttct tgtkgttct	540
10	tctggactac caaggtatgt tgcccgtttg tctctactt ccaggaacat caactaccag	600
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	gccatttgtt cagtggttcg tagggcttcc cccactgtt tggttttcag ttatatggat	840
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	gtacacaaa	1029
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	20 25 30	
45	Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln	
	35 40 45	
50	Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro	
	50 55 60	
55	Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu	
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	Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala	
	85 90 95	

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5 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
100 105 110

10 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
115 120 125

15 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
130 135 140

20 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

25 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

30 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

35 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

40 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

45 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
225 230 235 240

50 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

55 Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys
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<210> 30
<211> 226
<212> PRT
<213> hepatitis B virus

<220>
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<222> (95)..(95)
<223> Xaa is any amino acid

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<400> 30

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 10 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
 35 40 45
 15 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60
 20 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80
 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Xaa Val
 85 90 95
 25 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
 100 105 110
 30 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala
 115 120 125
 35 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 40 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
 145 150 155 160
 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205
 55 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Tyr Ile
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 accctgttcc gactactgcc tctcccatat cgtcaatctt ctcgaggact ggggaccctg 240
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 ctctcaattt tctaggggga gcacccacgt gtcttgcca aaatttgag tccccaacct 420
 25 ccaatcactc accaacctct tgtctccaa tttgtctgg ttatcgctgg atgtgtctgc 480
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 35 40 45
 20 Leu Ser Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp
 50 55 60
 Tyr Cys Leu Ser His Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys
 65 70 75 80
 25 Thr Glu Tyr Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ala Arg
 85 90 95
 30 Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Thr
 100 105 110
 35 Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Ser Thr
 115 120 125
 40 His Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr
 130 135 140
 Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala
 145 150 155 160
 45 Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro His Leu Leu
 165 170 175
 50 Val Gly Ser Ser Gly Leu Pro Arg Tyr Val Ala Arg Leu Ser Ser Thr
 180 185 190
 55 Ser Arg Asn Ile Asn Tyr Gln His Gly Thr Met Gln Asp Leu His Asp
 195 200 205
 Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Tyr Lys Thr

- 36 -

210 215 220
 5 Phe Gly Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe
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 Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln
 10 245 250 255
 Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys
 260 265 270
 15 Leu Ala Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val
 275 280 285
 20 Gln His Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser
 290 295 300
 25 Leu Gly Ile His Leu Asn Pro Xaa Lys Thr Lys Arg Trp Gly Tyr Ser
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 5 Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg Val Arg Gly Leu Tyr
 35 40 45
 10 Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr
 50 55 60
 15 Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg Thr Gly Asp Pro Ala
 65 70 75 80
 20 Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val
 85 90 95
 25 Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln
 100 105 110
 30 Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro
 115 120 125
 35 Thr Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro
 130 135 140
 40 Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg
 145 150 155 160
 45 Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu
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 50 Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu
 180 185 190
 55 Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile
 195 200 205
 60 Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro
 210 215 220
 65 Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe
 225 230 235 240

- 38 -

Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser
 245 250 255

5 Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val
 260 265 270

10 Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr
 275 280 285

15 Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu
 290 295 300

20 Trp Val Tyr Ile Xaa Thr Leu Leu Lys Pro Asn Val Gly Val Thr Pro
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25 Asn Ile Leu Tyr Thr Lys Ser Asn
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 tactttctctg ctgggtggctc cagttcagga acagtgagecc ctgctcagaa tactgcctct 180
 gccatatcgt caaccttctc gaagactggg gacctgtac cgaacatgga gaacatcgca 240
 tcaggactcc taggacctct gctcgcggtta caggcgggggt tttctctggt gacaaaaatc 300
 45 ctcacaatac cacagagtct agactcgttg tggacttctc tcaattttct agggggaaca 360
 cccgtgtgtc ttggccaaaa ttgcagtc ccaatctcca gtcactcacc aacttggtgt 420
 cctccaattt gtcttggtta tcgctggatg tgtctgcggc gttttatcat ctctctctgc 480
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 gtttgctctc taattccagg atcatcaacc accagcaccg gaccatgcag aacctgcacg 600
 55 actcctgtct aaggaacctc tatgtttccc tcatgttgct gtacaaaacc tacggacgga 660
 aactgcacct gtattcccat cccatcatct tgggctttcg caaaatacct atgggagtg 720

- 39 -

gcctcagtcg gttctctctg gctcagttta ctagtgcctg ttgttcagtg gttcgtaggg 780
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 10 ttggggggtg gggctccttg 980

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 35 40 45
 Phe Ser Arg Gly Asn Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 35 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 40 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95
 45 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110
 50 Ala Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Arg Thr
 115 120 125
 Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140
 55 Met Leu Leu Tyr Lys Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

- 40 -

5 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

10 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Val Cys Ser Val Val Arg
 180 185 190

15 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

20 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Ala Ala Val
 210 215 220

25 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr
 225 230 235 240

30 Lys Arg Trp Gly Tyr Ser Leu Gln Phe Met Gly Tyr Val Ile Gly Gly
 245 250 255

35 Trp Gly

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 <211> 226
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50 Ala Gly Phe Phe Ser Leu Thr Lys Ile Leu Thr Ile Pro Gln Ser Leu
 20 25 30

55 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Val Cys
 35 40 45

60 Leu Gly Gln Asn Ser Gln Ser Gln Ile Ser Ser His Ser Pro Thr Cys
 50 55 60

65 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80

- 41 -

Ile Ile Phe Leu Cys Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

5 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
100 105 110

10 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
115 120 125

15 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
145 150 155 160

20 Tyr Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

25 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

30 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
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35 Leu Ser Pro Phe Met Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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Tyr Ile
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<213> hepatitis B virus

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ataccgcaga gtctagactc gtggtggact tctctcaatt ttcgaggggg aactaccgtg 240
55 tgtcttggcc aaaattcgca gtccccaacc tccaatcact caccaacctc ctgtctctca 300
acttgtctctg gttatcgctg gatgtgtctg cggcgtttta tcatmttctt cttcatcctg 360

- 42 -

ctgctatgcc tcattctctt gttgggtctt ctggactatc raggtatgtt gcccggttgc 420
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 gctcaaggaa cctctatgta tccctctctg tgctgtacca aacctacgga cggzaattgc 540
 acctgtattc ccattccatc atcctgggct ttcggaaaat tcctatggga gtgggcctca 600
 10 gcccggttct cctggctcag ttactagtgc ccatttgttc agtggttcgt agggctttcc 660
 cccactgttt ggctttcagt tatatggatg atgtgggtatt gggggccaag tctgtaymgc 720
 15 atcttgagtc cctttttacc gctgttaccg atttctcttt gtctttgggt atacatttaa 780
 accctaacaa aacaaagaga tgggggttact ctctgaattt tatgggttat gtcattggaa 840
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55 His Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ser Arg Val Thr
 35 40 45

- 43 -

Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Ala Glu Ser
 50 55 60

5 Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn Tyr Arg Val
 65 70 75 80

10 Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu
 85 90 95

15 Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe
 100 105 110

Tyr His Xaa Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly
 115 120 125

20 Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Asn Ser Arg
 130 135 140

25 Ile Leu Xaa His Gln His Gly Thr Met Pro Asn Leu His Asp Tyr Cys
 145 150 155 160

30 Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Gln Thr Tyr Gly
 165 170 175

35 Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys
 180 185 190

40 Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln Phe Thr
 195 200 205

45 Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala
 210 215 220

50 Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val Xaa His
 225 230 235 240

55 Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly
 245 250 255

Ile His Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn
 260 265 270

Phe Met Gly Tyr Val Ile Gly Ser Tyr Gly Ser Leu Pro Gln Glu His

- 44 -

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 20 25 30

 40 Asn Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu
 35 40 45

 45 Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser
 50 55 60

 50 Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Arg Gly Gly Thr Thr Val
 65 70 75 80

 Cys Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr
 85 90 95

 55 Ser Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg

- 45 -

	100	105	110
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10	Val Leu Leu Asp Tyr Xaa Gly Met Leu Pro Val Cys Pro Leu Ile Pro 130 135 140		
	Gly Ser Ser Xaa Thr Ser Thr Gly Pro Cys Arg Thr Cys Met Thr Thr 145 150 155 160		
15	Ala Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Thr 165 170 175		
20	Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly 180 185 190		
25	Lys Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu 195 200 205		
30	Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp 210 215 220		
35	Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Xaa 225 230 235 240		
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	<211> 912		
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	tttcttggtg acaagaatcc tcacaatacc gcagagtcta gactcgtggt ggacttctct 240		

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caattttcta gggggaacta ccgtgtgtct tggccaaaat tcgcagtcce caacctocaa 300
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 gtattggggg ccaagtctgy acagcatctt gagtccttt ttaccgcggt gaccaatttt 780
 20 cttttgtctt tgggtataca tttaaaccct aacaaaacaa agagatgggg ttactctctg 840
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 Leu Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg
 35 40 45
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 Ile Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp
 50 55 60
 55 Lys Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser
 65 70 75 80

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5
 10
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 40
 45
 50
 55

Gln Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val
 85 90 95
 Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp
 100 105 110
 Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro
 115 120 125
 Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr
 130 135 140
 Val Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly
 145 150 155 160
 Thr Met Pro Asn Leu His Asp Tyr Cys Ser Arg Asn Leu Tyr Val Ser
 165 170 175
 Leu Leu Leu Leu Tyr Gln Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser
 180 185 190
 His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu
 195 200 205
 Ser Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val
 210 215 220
 Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val
 225 230 235 240
 Val Leu Gly Ala Lys Ser Xaa Gln His Leu Glu Ser Leu Phe Thr Ala
 245 250 255
 Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys
 260 265 270
 Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly
 275 280 285
 Ser Tyr Gly Ser Leu Pro Gln Glu His Ile Ile Gln Lys Ile Lys Glu
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 35 40 45
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 Phe Leu Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr
 50 55 60
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 Arg Ile Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu
 65 70 75 80
 40 Asn Phe Leu Gly Gly Thr Thr Val Cys Leu Gly Gln Asn Ser Gln Ser
 85 90 95
 45 Pro Thr Ser Asn His Ser Pro Thr Ser Cys Pro Pro Thr Cys Pro Gly
 100 105 110
 Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu
 115 120 125
 50
 Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Xaa Gly Met
 130 135 140
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 Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr Ser Thr Gly
 145 150 155 160

- 49 -

5 Pro Cys Arg Thr Cys Met Thr Thr Ala Gln Gly Thr Ser Met Tyr Pro
165 170 175

10 Ser Cys Cys Cys Thr Lys Pro Thr Asp Gly Asn Cys Thr Cys Ile Pro
180 185 190

Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp Ala Ser
195 200 205

15 Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe
210 215 220

20 Val Gly Leu Ser Pro Thr Val Trp Leu Ser Val Ile Trp Met Met Trp
225 230 235 240

25 Tyr Trp Gly Pro Ser Leu Xaa Ser Ile Leu Ser Pro Phe Leu Pro Arg
245 250 255

30 Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile
260 265

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